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中国赤松梢斑螟种团的种类订正

(鳞翅目:螟蛾科,斑螟亚科)

王平远 宋士美
(中国科学院动物研究所)

我国绿化造林常见害虫松梢螟,隶于梢斑螟属 (*Dioryctria* Zeller)。幼虫蛀食针叶树嫩梢和球果,以致顶梢枯死,球果破坏。1982年我们发表本属新种与新种团以后(王、宋,1982),着重研究赤松梢斑螟种团 (*Sylvestrella* group)。Matuura 和 Munroe (1972) 研究只知 *D. sylvestrella* (= *D. splendidella*) 一种。现在我们研究本种团包括1个新种和4个旧种: *Dioryctria kunmingnella* Wang et Sung 新种, *Dioryctria rubella* Hampson, *Dioryctria yuennanella* Caradja, *Dioryctria sylvestrella* Ratzeburg, *Dioryctria magnifica* Munroe. 本文描述新种,旧种 *D. rubella* 和 *D. yuennanella* 原记载缺外生殖器,现根据伦敦和布加勒斯特收藏模式标本重新描述。补充生物学分布,订正记载错误,编种团种类检索表。新种模式标本和研究用标本保存于中国科学院动物研究所。

工作中蒙有关各博物馆支援,惠借模式标本或寄赠资料。大英博物馆昆虫部 Mr. M. Shaffer 借给 *D. rubella* 中国舟山群岛模式标本和夏威夷标本 *D. splendidella* 定名玻片标本。罗马尼亚布加勒斯特自然历史博物馆昆虫部 Dr. A. Popescu-Gorj 借给 *D. yuennanella* 模式标本。加拿大渥太华生物分类研究所 Dr. E. Munroe 和 Dr. A. Mutuura, 西德波恩 Alexander Koenig 自然历史博物馆 Dr. D. Stünig 借给 *D. magnifica* 雄性副模标本。美国匹兹堡 Carnegie 自然历史博物馆昆虫部 Ms. Pat Vachino 借给资料,谨向以上各位的热心帮助表示感谢。

赤松梢斑螟 Sylvestrella 种团

Mutuura 和 Munroe (1972) 根据形态和外生殖器特征确定本种团特征:前翅无竖鳞,下颚须鳞毛状,雄性触角基干简单,饰有鳞片,外生殖器抱器背的抱握钩弯曲如镰钩,抱器背一侧有纵褶状脊取名纵端脊 (longitudinal terminal ridges)。雌性外生殖器囊导管有骨化窄长纵纹,基部三叶状不明显,末端无前曲突起。幼虫为害松树,有时加害其它针叶树。以 *Dioryctria sylvestrella* (Ratzeburg) 为代表。

中国赤松梢斑螟 *Sylvestrella* 种团种类检索

1 前翅外横线曲折交错锯齿状,中室端脉斑不明显。雄性抱器端细长,末端延伸。雌性囊导管长为宽的10倍…

本文于1984年2月收到。

………………………………………………………………云南松梢斑螟 *Dioryctria yuennanella* Caradja
— 前翅外横线向翅基伸出两个、向翅外缘伸出一个尖突。中室端脉斑明显 2
2. 前翅中室端脉斑灰色。雄性抱器端基部钝宽直立，伸出短尖突 ………………………………………………………昆明松梢斑螟 *Dioryctria kunmingnella* Wang et Sung 新种
— 前翅中室端脉斑白色。 3
3. 雄性抱器背阔镰刀状，抱器端伸出短尖突，抱器背纵端脊皱褶多。雌性囊导管长为宽的5倍………………………………………………………赤松梢斑螟 *Dioryctria sylvestrella* Ratzeburg
— 雄性抱器背窄镰刀状，抱器端伸出长尖突，抱器背纵端脊皱褶少。雌性囊导管长为宽的8倍。 ………4
4. 雄性抱器端顶部尖突细窄。………………………………微红梢斑螟 *Dioryctria rubella* Hampson
— 雄性抱器端顶部尖突粗壮。………………………………大梢斑螟 *Dioryctria magnifica* Munroe·

昆明松梢斑螟 *Dioryctria kunmingnella* 新种(图1;图版1:1)

翅展：雄蛾27.5—28.5，雌蛾28.6—29.4毫米。头部灰褐。额区圆形，左右两侧鳞毛上竖立浅褐。头顶触角间鳞片两束黄褐直立。后头鳞毛细长浅褐。口喙卷曲，敷盖暗褐鳞片。触角浅褐，细长纤毛状，雄蛾触角干柄节基部内侧鳞片略拱起。单眼一对分别位于触角后方。有毛隆。下唇须灰褐上弯，第二节越过头顶，第三节末端尖细突出头顶以上。下颚须灰褐被下唇须遮蔽。胸部黑褐。领片鳞片黄褐与黑褐交错。翅基片黑褐。腹部黑褐。前翅底色灰褐。翅面光滑无竖立鳞片。基域深黑夹杂黄褐色。亚基域深黑月牙形。基域和亚基域间黄褐及灰色鳞片混杂。前中线黑色，向基域一侧镶白边，伸出两个黑尖齿突。前翅中域布满灰褐鳞片，有一白色中室端脉斑，靠近翅后缘沿前中线基部有一白斑。后中线黑色，向翅外缘有白边，沿翅中部向翅端线伸出三角形尖突，向翅外缘有黄与黑褐鳞片。缘线由七个黑点组成。缘毛黄褐。后翅灰褐，各翅脉颜色略深。缘毛灰色。

雄性外生殖器(图1：a, b, c)：爪形突两侧平行，顶端宽阔拱起与基部等宽，边缘向内卷曲，靠近基部略加凹陷，顶部缓圆，基部两侧收缩成球状。颚形突细小、形状如梨，顶端伸出尖钩状爪形端突，两侧有弓状几丁质臂支持中央的端突。匙形突细长硬化舌状位于肛管末端爪形突与颚形突之间。背兜硬化盾状，顶端狭窄向下扩展，两侧边缘与颚形突连接，中央内陷成硬化宽缘如U字。基腹弧坚硬如正V字形，顶端两侧与背兜基部相接，末端收缩。阳茎端环椭圆形，两侧伸出指头状长臂。抱器背基突一对细长棒状，位于阳茎端环两侧。抱器瓣分背腹两部分宽阔舒展。背面是坚硬粗壮的抱器背，其基部连接抱器背基突。腹面是抱器腹，与基腹弧接触。抱器背骨化部分边缘多皱褶，表面披细毛，末端伸成粗壮镰钩状的抱器端。有四条皱褶状纵端脊。抱器弱骨质化与纵端脊基部连接，表面密布细毛，边缘圆形，基部有硬化伸展的抱器腹。抱器腹与抱器背基部有硬棘沟通。基腹弧如V字，两臂与抱器背基部接近。阳茎坚硬细长筒状，顶端三分之二充满细针状的端角状器一侧有密集的短针。基部有一个粗大的基角状器，味刷形状如图1c。

雌性外生殖器(图1：d)：肛乳突圆形，两侧狭窄。囊导管坚硬细长，上端窄，逐渐向下扩展，中央凸出两侧倾斜，由上向下伸出三条皱褶，两侧多皱纹。交配囊扭曲膜质半透明，充满带状细刺。

幼虫为害：云南松 *Pinus yunnanensis* Franch.

正模♂。云南昆明。1963 VII. 4。云南林科所采。外生殖器编号 ph. 160。

配模♀。地点、日期及采集者同上。外生殖器编号 ph. 159。

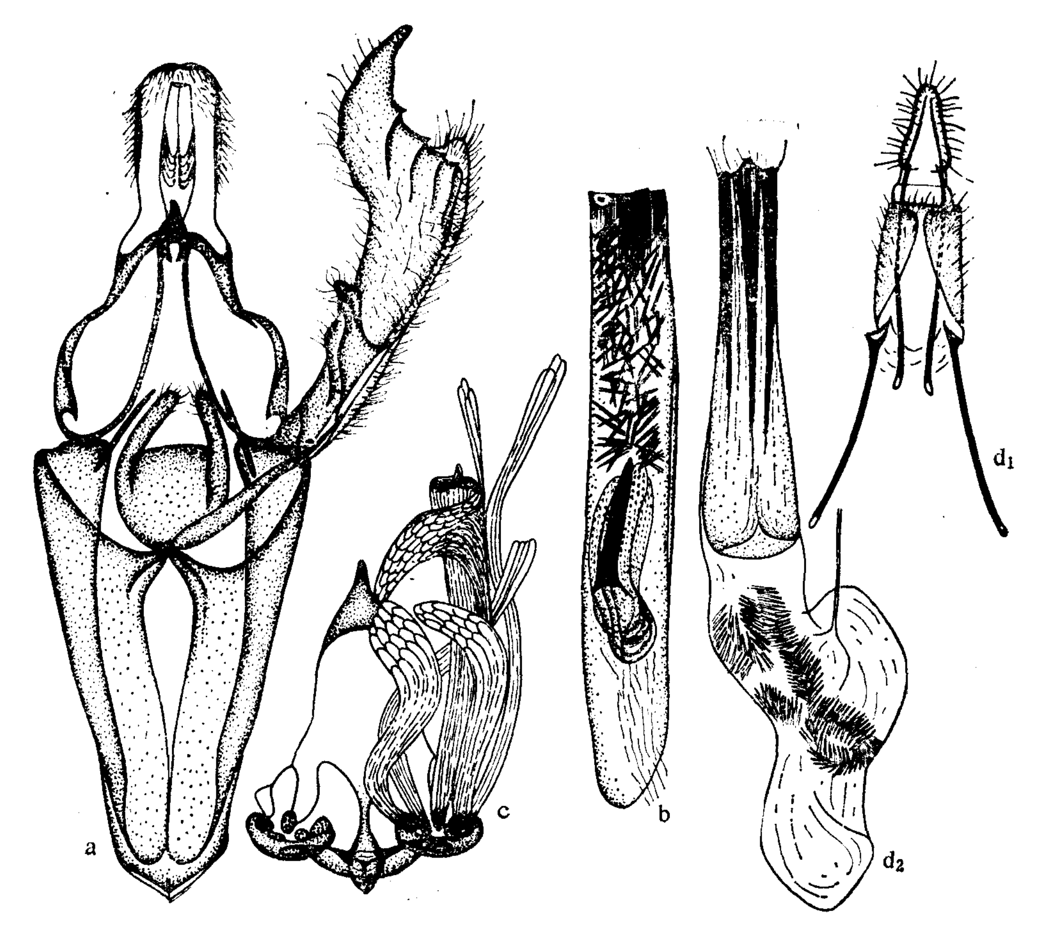


图 1 昆明松梢斑螟 *Dioryctria kunmingnella* sp. nov.
a. 雄性外生殖器 (male genitalia) b. 阳茎 (aedeagus) c. 味刷 (corema)
d. 雌性外生殖器 (female genitalia)

副模 2♂♂。云南昆明。1964 V. 27. 云南林科所采。外生殖器编号 ph. 532. ph.533。

注释: 本新种成虫翅面斑纹和颜色与 *Dioryctria rubella* Hampson 接近, 难于辨别。两种雄性外生殖器有区别: *Dioryctria kunmingnella* (新种) 的抱器瓣宽阔粗大。抱器背镰钩状抱器端的末端向上拱立, 伸出粗壮的钝尖。*Dioryctria rubella* 的抱器瓣细小, 抱器端向前延伸突出细尖。本新种的成虫在云南昆明每年 5 月及 7 月出现。一年发生两代。幼虫为害云南松枝梢。*Dioryctria rubella* 与本新种为同域分布。幼虫也为害云南松。

云南松梢斑螟 *Dioryctria yuennanella* Caradja 重新描记(图 2;图版 I: 2.6)

Dioryctria yuennanella Caradja, A. and E. Meyrick 1937. Materialien zu einer Lepidopterenfauna des Yülingshan Massivs (Provinz Yünnan). Dt. Ent. Z. Iris, Dresden. 51. p. 154.

Caradja (1937) 用德文发表本种,内容简略没有插图。转译成中文是: "云南玉龙山 6—8 月份大量出现于 2,800—3,200 米。可能为害云南松枝梢或球果。翅展♂ 31—33, ♀ 32—35 毫米。这个大型种类最接近 *abietella*; 与 *abietella* 的区别是体形明显较大。前

翅几乎一致灰色不混合褐色和不明显的斑纹。前横线与后横线彼此有明显的不同，而 *abietella* 有较深的交错锯齿。后翅比 *abietella* 略深灰色，下唇须的下侧和头顶为锈褐色。触角褐色。”

Caradja 根据 *D. yuennanella* 体形大，前翅颜色一致灰色，内横线与外横线明显不同，外横线有较深的交错锯齿特征认为与 *D. abietella* 有区别。但是缺乏外生殖器、寄主地理分布。他所比较的这两个种：*D. abietella* 属于 *abietella* 种团；*D. yuennanella* 属于 *sylvestrella* 种团。他认为本种幼虫为害植物“可能为害云南松”这一估计有错误。据我们调查 *D. yuennanella* 为害的是华山松。我们核对模式标本并比较采自原产地标本，作补充描记如下。

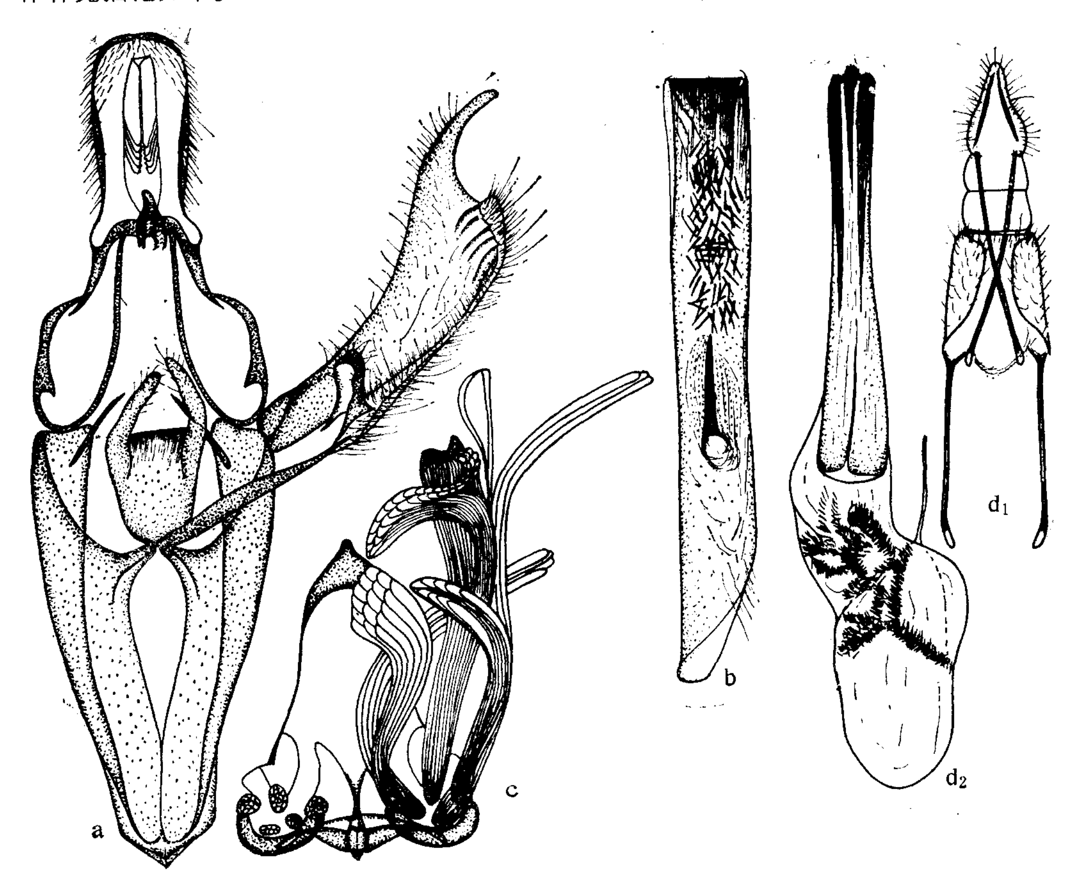


图 2　云南松梢斑螟 *Dioryctria yuennanella* Caradja
a. 雄性外生殖器 (male genitalia)　b. 阳茎 (aedeagus)　c. 味刷 (corema)
d. 雌性外生殖器 (female genitalia)

翅展：雌雄均为 28—35 毫米。头部圆形，覆盖棕褐与灰褐鳞片，复眼两侧有少数黑褐鳞片。额区浅褐，头顶两触角间深棕褐。后头浅褐。触角细长，雌雄异形。雄蛾触角锯齿状，基节膨大盖黑色鳞片，柄节黑色基部一侧略粗，夹杂少数褐色鳞。鞭节锯齿状一侧密布细毛，基部黑端部褐色。雌蛾触角灰褐、基节膨大，鞭节灰色细长线状光滑无毛。单眼一对位于触角后方。毛隆灰色丛针状，位于后头向复眼的一侧。下唇

须向上弯曲，鳞片浅棕、灰褐、深褐与黑色交错，两侧鳞片末端白色。下唇须第一节短粗扩展、第二节宽阔、向上斜伸越过头顶，第三节细小短钝，末端略尖。下颚须扩展，黑褐灰三色鳞片交错。翅肩片黑，末端边缘白色中间夹杂黑。腹部各节黑褐。前翅底色浅灰、背面光滑无竖鳞。翅脉红褐。前翅基域红褐、亚基域黑色，基域与亚基域间红褐。内横线黑，朝向翅基伸出两个黑尖齿。外缘镶灰白色边。中域灰褐，靠近内横线有暗褐斑，中室端脉白斑不明显。外横线暗褐多锯齿，弯曲伸缩犬牙状，朝向翅外缘一侧也有灰褐锯齿。亚基线曲折，内侧黑，外侧灰色。端线暗褐。缘毛基部暗褐，端部略红。后翅浅灰，靠近翅前缘和外缘略深。缘毛灰色。

雄性外生殖器（图 2：a—c）：坚硬骨化，顶端缓圆、两侧平行，背面披细短毛，腹面内凹边缘较深构成宽缘。肛管匙形突位于爪形突的腹面内侧。爪形突基部开扩向内缓弯圆形与背兜衔接。颚形突中央细小囊核状，顶端内弯如鸟嘴，两侧伸出弓形宽臂。背兜坚硬如倒 V 字，边缘宽厚。腹面两侧稍宽、基部内弯。基腹弧如正 V 字，两侧厚向腹面折曲。阳茎端环薄，几丁质椭圆形，向侧向上伸出长臂，末端有细毛。抱器背基突延伸成长臂。阳茎短粗，顶端有多枚细针状的端角状器，基部有一根粗针状基角状器。味刷如图。

雌性外生殖器（图 2：d）：肛乳突窄长，顶端尖披满细毛。囊导管两侧狭窄下伸，顶端钝圆突出，基部开展。交配囊圆形，颈部密布细针、底部有细针。

幼虫为害：华山松 *Pinus armandii* Franch.

生活史与习性：我们调查在云南一年发生二代，以老熟幼虫在被害寄主枝梢内越冬。于翌年 4 月份开始化蛹。成虫于 4 月中旬陆续出现。5 月中下旬是羽化盛期。成虫产卵于华山松树顶第一轮枝杈上。幼虫孵化后立即从枝杈向内蛀孔造成隧道。由蛀孔排出红褐色粒状粪便和树木排出的松脂凝聚成漏斗状团块。幼虫在枝梢内为害，老熟后在枝梢内结茧化蛹。8 月中下旬是第 2 代成虫羽化盛期。第二代幼虫继续为害，于 10 月下旬在被害枝梢内越冬。

华山松的主梢被害后折断形成颓顶，四周滋生出平伸的侧梢。但侧梢不能直立替代主梢，致使树干弯曲并在节间处造成伤疤。严重妨碍华山松的自然生长。自 1973 年以来，云南省丽江、曲靖地区连年发生为害，曲靖地区海寨林场有 28 万亩华山松全部受害，主梢被害率达到 95% 以上（图版 I：6）。

分布：云南丽江玉龙山，曲靖，云龙、玉溪，大理，镇雄。

模式标本：现保存在罗马尼亚布加勒斯特"Grigore Antipa"自然历史博物馆。

研究用标本（10♂♂，13♀♀）：云南：玉龙山，宜良，曲靖，云龙，大理，玉溪，镇雄。

注释：本种成虫翅展特别长。前翅外横线多曲折犬牙状细线，与其它种类有明显区别。

微红梢斑螟 *Dioryctria rubella* Hampson 重新描记（图 3；图版 I：3，5）

Dioryctria rubella Hampson 1901. in Romanoff, N. M. 1901. Memoires sur les Lepidopteres, Tom. 8, p. 533. pl. lvi. fig. 15.

Phycita rubella South 1901. Trans. Ent. Soc. London p. 410.

Phycita rubella Caradja 1933 (nec Hampson). Caradja, A. and E. Meyrick 1933 Materialien zu einer Microlepidopteren-Fauna Kwangtung. Dt. Ent. Z. Iris, Dresden. Band 47. p. 144.

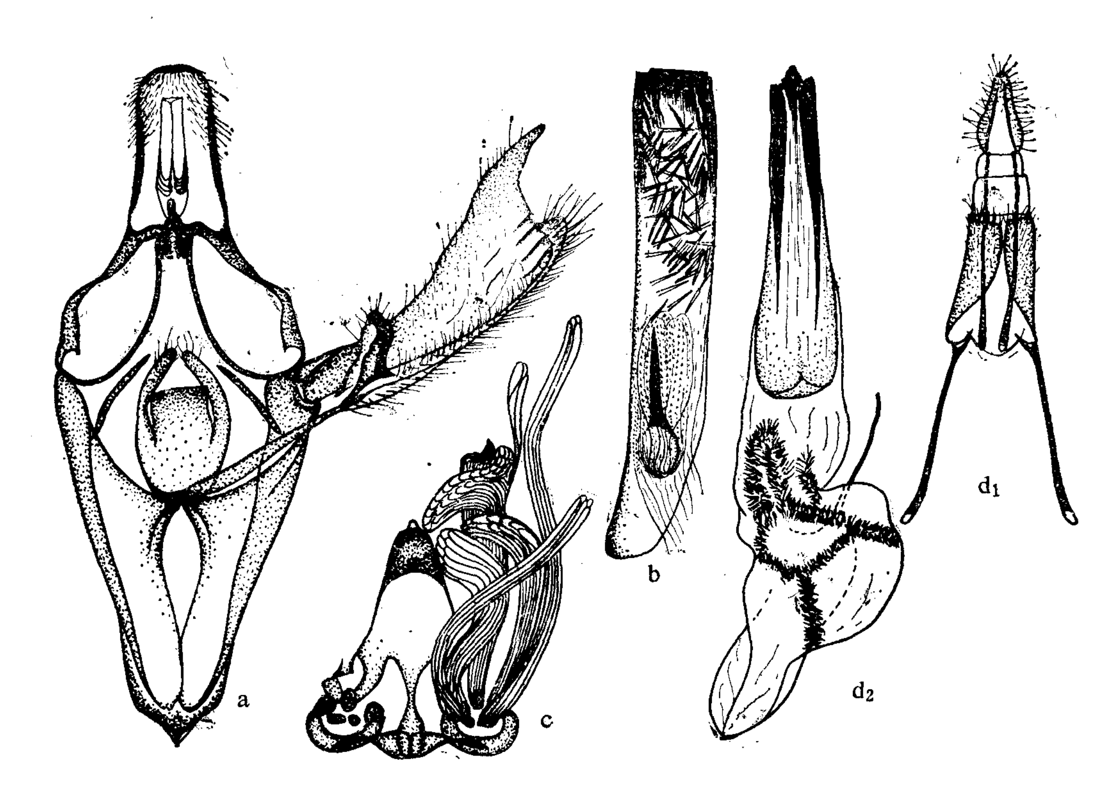


图 3　微红梢斑螟 *Dioryctria rubella* Hampson
a. 雄性外生殖器 (male genitalia)　b. 阳茎 (aedeagus)　c. 味刷 (corema)
d. 雌性外生殖器 (female genitalia)

Dioryctria splendidella Tsai 1973 (nec Herrich-Schaeffer). 蔡邦华 1973 昆虫分类学中册 p. 213, 图版 II. 2。

Dioryctria splendidella Wang 1980 (nec Herrich-Schaeffer) [部分 partim]. 王平远 1980 中国经济昆虫志。第 21 册。螟蛾科。pp. 77—78。

1901 年，Hampson 鉴定 Walker 采自我国舟山群岛的标本，在 Romanoff 鳞翅目著作专集第 8 册 533 页用法文描记这种为新种。Caradja 和 South 把这种移到 *Phycita* 属。蔡邦华(1973)，王平远(1980)误订为 *D. splendidella*。按 Hampson (1901) 关于 *Dioryctria rubella* 的原始描记内容简略。转译成中文是："♂ 翅展 30mm。前翅前缘域一致茜草玫瑰红色，靠近内缘红褐色，亚基线灰色，有一排黑色鳞毛；各横线通常灰色波浪形，内横线几乎在翅中央，背部有一深黑斑和一灰斑；外横线在中室中域皱褶和中部外侧向内构成弯角，边缘内侧灰黑色，中室内，中室中域和背方颜色暗；有一枚大形灰色端脉斑。外横线基部和内侧颜色相同。外缘线灰色，边缘一侧有黑点。后翅淡烟色；缘毛白色，缘线颜色深。头、胸和腹部皆红褐色。

舟山群岛(中国)。J. J. Walker 采。一雄。存放伦敦大英博物馆。"

Hampson 只用文字记述了雄性外部形态。至今还缺乏详细包括外生殖器在内的描记和绘图。我们核对借自大英博物馆收藏的模式标本和外生殖器玻片，以及菲律宾的本种标本和大宗采自国内各地的标本，重新描记如下。

微红梢斑螟 *Dioryctria rubella* Hampson（图 3 图版 I:3）

翅展：♂19—28 毫米。平均 24—25 毫米。♀19—30 毫米。平均 25—26 毫米。

头圆形浅灰褐，后头鳞片竖立。触角雌雄异形，雄蛾锯齿状、基节膨大柄节基部有一个黑鳞，鞭节细锯齿状一侧有细毛；雌蛾鞭节灰色线状无纤毛。有单眼和毛隆，其余部分雌雄相同。下唇须向上弯曲，第 1,2 两节灰褐，第 3 节深褐尖突越过头顶。下颚须褐色扩展。胸部鼠灰褐。领片和翅肩片灰褐。腹部各节基部深褐边缘浅灰褐。前翅底色灰褐夹杂深浅不同玫瑰红褐色。前翅前缘玫瑰红。内缘红褐。中室有一灰白斑，前翅基线有红褐、黑褐和浅灰色鳞片交错。亚基线灰色，外侧有一排黑鳞毛。内横线灰色弯曲波纹状，向翅中室一侧有一个白斑。外横线浅灰，近翅前缘和后缘两侧直伸。中室中域暗褐，朝翅外缘伸出三角形尖。外横线向中室一侧镶黑边。从前翅后缘向外横线三角形突有一个大白斑。外缘线灰色，内侧有一排黑点。缘毛褐色。后翅浅灰，沿肘脉有一排栉毛。缘线深灰。缘毛浅灰。

雄性外生殖器(图 3：a—c)：爪形突顶端圆形，两侧平行，边缘向内凹陷。颚形突细小梨形、伸出尖突、左右两侧有硬化弓状的宽臂与背兜连接。背兜硬化形状如盾。基腹弧两臂与背兜相连，腹面内陷如 V 字。阳茎端环薄骨质化，位于基腹弧中央呈圆形。顶端伸出细长指状两臂，末端有细毛。抱器背基突一对，细长位于阳茎端环两侧。抱器背末端粗壮，伸出镰钩形长尖突。抱器背以下有 3—4 条纵端脊。抱握器膜质披细毛、从纵端脊基部向后伸与抱器腹接连。抱器背坚硬伸长。阳茎细长筒状，基部有一粗大刺状的基角状器，端部有短针密集的端角状器。味刷如图 3c 所示。

雌性外生殖器（图 3：d)：肛乳突末端尖如乳头状，弱骨质化，表面披细毛。后表皮突和前表皮突弱骨化。囊导管细长伸出圆形突，两侧向内卷曲有细皱褶，基部展宽。交配囊膜质圆形，内有成团细针状小刺。导精管从交配囊顶端一侧伸出。

注释：本种雄性外生殖器抱器背镰钩状抱器端向外伸出长钩，与 *Dioryctria sylvestrella* 抱器端伸出的短钩有明显区别。又本种与 *Dioryctria kunmingnella*（新种）抱器端形状也不相同，后者比前者特别伸长。此外，本种成虫体形大小体色变化与幼虫所为害的寄主植物种类有关。我国南方马尾松种植区的体色偏红。北方和西南为害油松、黑松、云杉、白皮松的成虫则偏黑。因此只从外形难以区分。外生殖器构造上有明显不同，易于鉴别。

幼虫为害：云杉 *Picea wilsonii* Masters，赤松 *Pinus densiflora* Sieb. et Zucc，油松 *Pinus tabulaeformis* Carr.，黑松 *Pinus thunbergii Parl.*，樟子松 *Pinus sylvestris mongolica* Litv.，马尾松 *Pinus massoniana* Lambert，云南松，华山松。乔松 *Pinus walliehiana* Jackson。

本种幼虫在北京地区林场苗圃取食针叶树种繁多：油松、云杉、樟子松枝梢和球果都受害。在我国南方江苏、浙江、福建、安徽、湖南、江西、广东、广西为害马尾松。在西南为害云南松。

生活史与习性：根据我们调查饲养北京地区一年发生 2 代，以 4—5 龄幼虫在被害枝梢内越冬。越冬幼虫到翌年 4 月开始活动，5 月结茧化蛹。5—9 月都出现成虫。羽化盛期在 5 月下旬到 6 月中旬。幼虫共分 5 龄。1 龄幼虫孵化后立即钻进主梢和球果。幼虫期历经 30 余天。幼虫于 8 月上、中旬老熟在被害部位结茧化蛹。第 2 代成于 8 月中、下旬羽化产卵。所孵化的幼虫继续为害到 11 月份越冬至翌年 3 月。成虫羽化后即交配。

雌蛾每只产卵40—140粒，平均60粒(图版I:5)。

主梢被蛀食一空随即折断，另外滋生向上斜伸侧枝替代主梢。呈现被害树木缺乏主梢而树势歪斜不能成材。

幼虫蛀食为害习性，据1958年本所侯陶谦同志观查提供：一龄幼虫孵化后沿松针嫩叶基部皱褶内爬行，然后蛀入嫩梢针叶的表皮与韧皮部之间，排出粪便充满隧道。1—3龄幼虫若停在韧皮部而未进木质部，则把碎屑粪便遮盖虫体。3龄以后在隧道内如遇到外界侵扰，则张开大颚御敌，而后迅速进入隧道内部。幼虫为害当年长出的嫩枝顶梢和新生球果与果鳞裂缝。或从机械损伤处进入，或从其它害虫造成的伤口进入，或从旧蛀孔进入。4月份被越冬幼虫为害的针叶变黄，从蛀孔口连缀虫粪，5月份幼虫从主梢继续向下蛀食二年生枝杈致使树顶折断侧芽丛生滋长枝杈。幼虫蛀食球果选二年生鲜果，在果内蛀成不规则隧道，球果呈褐色而不脱落。同一枝梢内常有大小不等的幼虫为害。幼虫有转移现象。

模式标本：正模♂。浙江舟山群岛 (Chusan Island)。J. J. Walker 采。外生殖器标本玻片1370。存放伦敦大英博物馆。

1♂。菲律宾群岛 (Philippine Island)。J. D. B. 采 XI. 1980。外生殖器玻片 No. 11880。存放伦敦大英博物馆。

研究用标本(107♂♂，101♀♀)：黑龙江：岱岭(红松)。吉林：长春(黑松)。辽宁：沈阳，复县(赤松)，草河口(赤松)，旅顺，普兰店。河北：平泉(油松果)，易县西陵(油松)。山东：栖霞牙山，昆嵛山(赤松)。江苏：南京(马尾松)。安徽：宣城，全椒，滁县，黄山(马尾松)。江西：新建，黄溪，弋阳(马尾松)，浙江：天目山。福建：南平(马尾松)。湖南：东安(马尾松)。广东：广州(马尾松)。广西：来宾，雁山(马尾松)。四川：西昌(云南松)。云南：昆明，罗次(云南松)。北京(油松梢，乔松梢，樟子松球果、云杉球果)。

赤松梢斑螟 *Dioryctria sylvestrella* (Ratzeburg)(图4图版I:4)

Phycis sylvestrella Ratzeburg, (partim) 1840. Die Forst-Insekten, Berlino. Vol. II. p. 242. taf. 15. fig. 1.

Dioryctria splendidella Ragonot, 1888. Ent. Month. Mag., Vol. 22. p. 52.

Dioryctria sylvestrella Zocchi. 1961. Contributi alla conscenza degli Insetti delle piante forestali. V. Il gen. *Dioryctria* Zell. (Lepidoptera, Pyralidae) in Italia. Redia 46: 50—75. Fig. XVII, XVIII.

Dioryctria splendidella Wang (nec Herrich-Schaeffer) 1980. Economic Insect Fauna of China Fasc. 21. Lepidoptera: Pyralidae. p. 78—79 (partim) [黑龙江]。

本种学名长期以来沿用1888年 Ragonot 鉴定的 *Dioryctria splendidella*。Zocchi (1961) 研究意大利松梢螟，考证发现这种应该是早些时候 Ratzeburg 于1840年发表 *Dioryctria sylvestrella* 的同物异名。

王平远(1980)在经济昆虫志螟蛾科中记载 *Dioryctria splendidella* 分布黑龙江的部分标本应该是这个种。由于当时编著主要依据成虫外部形态，未涉及外生殖器的比较。又本种翅面斑纹极易与另外一种 *Dioryctria rubella* 混同。但是本种的雄性外生殖器抱器背末端的抱器端短钝。纵端脊有6—8条，抱器瓣宽阔。

此外，本种以前多被误认为是我国分布广泛的常见种。经过订正研究，比较外生殖器构造，现证实多数都是 *Dioryctria rubella* 的误定。我国大陆上 *Dioryctria sylvestrella* 只在

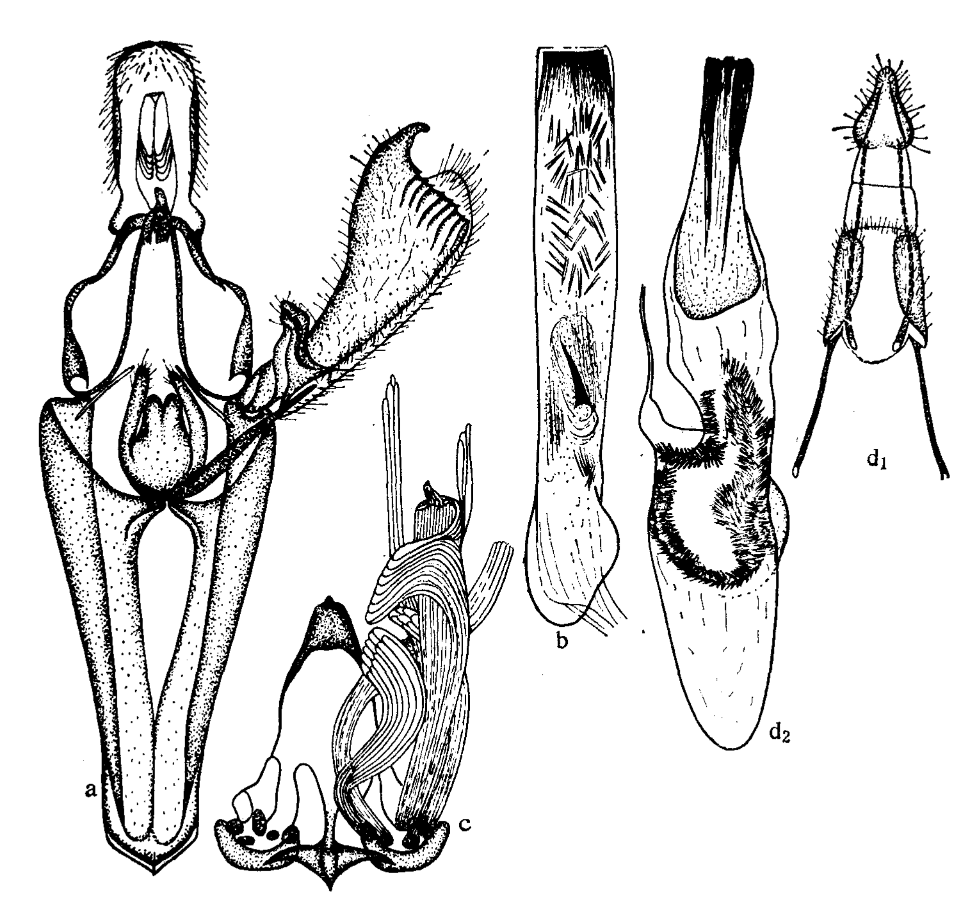


图 4 赤松梢斑螟 *Dioryctria sylvestrella* (Ratzeburg)
a. 雄性外生殖器 (male genitalia) b. 阳茎 (aedeagus) c. 味刷 (corema)
d. 雌性外生殖器 (female genitalia)

黑龙江省有分布。成虫和外生殖器如图版 I:4。图 4 。

研究用标本: *Dioryctria splendidella* H.—S. 1♂. Oudus (London) 31. VII. 1935. J. T. Atkins 采。外生殖器玻片 NO. 8790. H. Marion 制作。No. 264. 16. XI. 1949. 存放伦敦大英博物馆。黑龙江(2♂♂,4♀♀): 岱岭,五营。

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Mutuura, A. and E. Munroe 1972 American species of *Dioryctria* (Lepidoptera: Pyralidae) III. Grouping of species: species of the *auranticella* group, including the asian species, with the description of a new species. *Can. Ent.* **104**(5): 609—25.

———— 1974 A new genus related to *Dioryctria* Zeller (Lepidoptera: Pyralidae: Phycitinae), with definition of an additional species group in *Dioryctria*. *Can. Ent.* **106**: 937—40.

REVISION OF CHINESE CONEWORMS *DIORYCTRIA* OF THE *SYLVESTRELLA* GROUP

(Lepidoptera: Pyralidae, Phycitinae)

WANG PING-YUAN　SUNG SHIH-MEI
(Institute of Zoology, Academia Sinica)

Mutuura and Munroe (1972, 1974) classified the world species of *Dioryctria* into 8 species groups. Wang et Sung (1982) discovered an additional *mongolicella* group from China. Altogether 9 species groups of the genus *Dioryctria* are known. The *sylvestrella* group is represented by *D. sylvestrella* (=*D. splendidella*) from Europe and Asia, but has not been studied in detail. However, after a thorough study of specimens collected in China, we recognized 5 species. These are: *Dioryctria kunmingnella* Wang et Sung sp. nov., *Dioryctria yuennanella* Caradja, *Dioryctria rubella* Hampson, *Dioryctria sylvestrella* Ratzeburg and *Dioryctria magnifica* Munroe.

All species described in this paper were based upon comparisons of a number of genitalia from the type specimens loaned and dissections of specimens collected from different parts in China mainland. Due to the original descriptions of *Dioryctria yennanella* Cardaja and *Dioryctria rubella* Hampson were brief with no illustrations and dissections of genitalia and *Dioryctria rubella* had been misidentified by authors as *Dioryctria splendidella,* it is considered necessary to give in this paper further revisional redescriptions and illustrations of genitalia of these species. It is expected that informations provided here will encourage and assist for a better understanding of Chinese *Dioryctria* of the *sylvestrella* group. A key to species is given in the Chinese text. All type specimens of new species and other specimens studied are kept in the Institute of Zoology, Academia Sinica.

The authors wish to acknowledge with thanks the cooperations and help of the following individuals and institutions who, through their support and encouragements have materially aided of literatures and loan of type specimens for the present study.

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***Dioryctria kunmingnella* sp. nov.**　(Fig. 1. Plate I:1)

Wing expanse of male 27.5—28.5 mm. of female 28.6—29.4 mm. Head griseous fus-

cescent. Frons rounded, with griseous erected scales. Occipital with light fuscescent long scales. Tongue highly developed and covered with fusceous scales. Antennae light fuscescent, slender and ciliated. Antennal shaft in male with inner scales slightly elevated. Ocelli and chaetosema present. Labial palpus griseous fuscescent upturned. Second joint over, third joint sharply pointed above the vertex. Maxillary palpus griseous fuscescent and covered by the labial palpus. Thorax dark fuscescent. Patagium fusco-piceaus mixed with ochraceous. Tegula dark fuscescent. Abdomen dark fuscescent. Forewing with ground color grisceous fuscescent, without raised scales. Basal area dark black mixed with yellow luteous subbasal area dark black, crescentiform. Between basal and subbasal areas mixed with yellow luteous and griseous scales. Antemedial line black with white lineing towards the basal area and raised up two pointed teeth. Median area scattered with grey griseous scales. Discocellular spot white. A white blotch close to posterior edge along with antemedial line. Postmedial line black, with white margin extending in medial area on terminal line with a triangular pointing. Outer margin mixed with yellow and dark fuscous scales. Marginal line black made of seven small spots. Cilia yellow fuscescent. Hindwing griseous fuscescent color, slightly darken along the veins. Cilia griseous.

Male genitalia (Fig. 1 a-c). Uncus broadly elevated with rounded tip, lateral sides parallel throughout, except basal portion incurved and inflected on sides. Gnathos pyriform and small in size. Apex extended in a small acute process supported by arched and heavily sclerotized lateral arms. Scaphium located between uncus and gnathos in sclerotized linguiform. Tegumen in strongly sclerotized shield. Tip narrowed in apex and expanded at base and connected with gnathos, involuted in U-shaped with sclerotized margins. Vinculum heavily sclerotized V-shaped. Apex connected with basal part of tegumen and terminal contracted gradually. Anellus oval, located on apex of vinculum, with two digitate arms extended. Transtilla in narrowed claviform, located by each side of anellus. Valvae expanded and sclerotized with marginal scabrous striations, covered with hairs and extended into elongated falciform cucullus. Ventral side with four plicated erect longitudinal terminal ridges, connected by one side with round and slightly sclerotized hairy harp connected basically with vinculum with carina. Vinculum highly sclerotized into V-shaped process. with two arms extended toward costal region. Aedeagus slender and elongated, apical region with numerous cornuti occupied about two third and a single large basal cornutus.

Female genitalia (Fig. 1d). Anal papillae with rounded tip and narrowed laterally. Ductus bursae slender with upper part narrowed and expanded downwards. Upper to ptrilobed and inclined by two lateral sides with numerous striations. Ductus bursa convoluted, translucent and membranaceous, with numerous spinules arranged in a chain.

Host plant: Yunnan pine (*Pinus yunnanensis* Franch)

Holotype: Male. Kunming, Yunnan, 4. July, 1963. Genitalia No. ph 160. Collected by S. M. Sung.

Allotype: Female. Location and date same as above. Genitalia No. ph 159.

Paratype: 2 females. Kunming, Yunnan. 27. May. 1964. Genitalia No. ph 532, No. ph 533. Collected by S. M. Sung.

Remarks: The color and pattern on fore wing of this new species are much similar

to *Dioryctria rubella* Hampson. They can be separated through structural differences of male genitalia. In *Dioryctria kunmingnella* (sp. nov.), the valva is expanded widely, the costa ending in outstanding erected cucullus which is much stronger in falcate shape with stout ending. The adults of *Dioryctria kunmingnella* (sp. nov.) appear in Kunming. Yunnan in May and July. There are two generations each year. The larvae bore in tree branches of the Luson Pine, *Pinus insularis.*

Dioryctria yuennanella Caradja, Redescription (Fig. 2. Plate I:2)

Caradja (1937) described this species based upon brief external features without further notes of genitalia. We compared our collections with the type specimen and redescribed this species in the Chinese text. The structures of male and female genitalia are shown in Fig. 2 a-d. The host plant Yunnan Pine, *Pinus yunnanensis* from the original description of Caradja was in mistake. We found that the larvae feed on the Armand Pine, *Pinus armandii* instead. The biology, life history and its distribution in Yunnan are also mentioned in the Chinese text.

Dioryctria rubella Hampson Redescription (Fig. 3. Plate I:3)

This species had been mistaken and confused in China by various authors as *Dioryctria splendidella.* Based upon a male specimen from Chusan Islands, China, collected by J. J. Walker, Hampson (1901) described in Romanoff's Memoires Vol. 8, p. 533 without details of the genitalia. Compared with the type and specimens collected from various parts in this country, we are able to clarify the status of this species and redescribe it in detail. Its genitalia are studied and figured in Fig. 3. The larvae infest both shoots and cones. There are a number of host plants including: Japanese red pine (*Pinus densiflora*), Chinese pine (*Pinus tabulaeformis*), Japanese black pine (*Pinus thunbergii*), Mengolian scotch pine (*Pinus sylvestris mongolica*), Masson pine (*Pinus massoniana*), Yunnan pine (*Pinus yunnanensis*), Armand pine (*Pinus armandii*), Himalayan pine (*Pinus griffithi*). So far, this species is known as widely distributed throughout China. There are two generations in Beijing suburbs. Overwintering in larval stage.

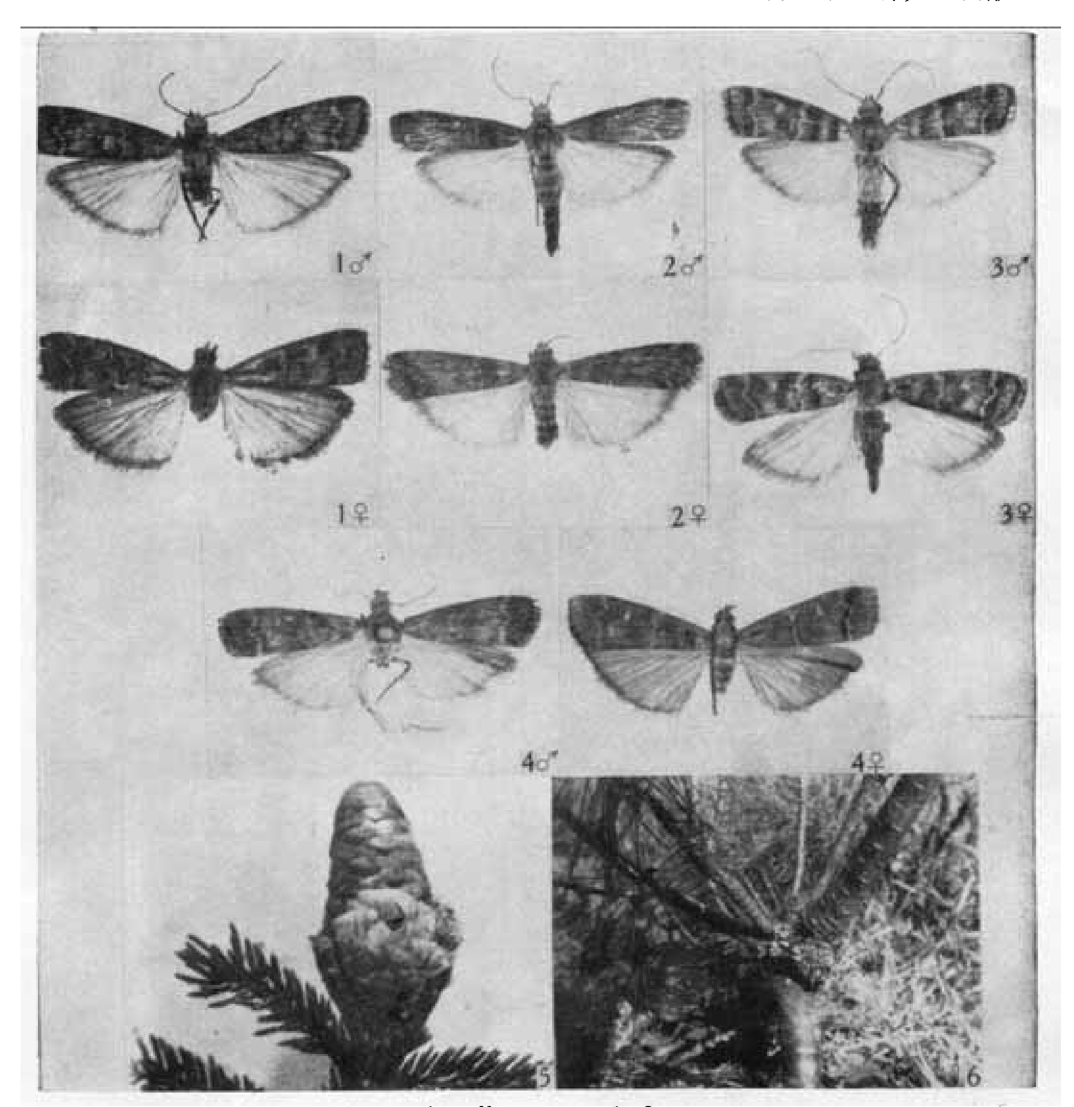
Dioryctria sylvestrella (Ratzeburg) (Fig. 4. Plate I:4)

This species is commonly known as *Dioryctria splendidella* in China, but oftentimes mistaken for *Dioryctria rubella.* The true *Dioryctria sylvestrella* is limited and confined only in Heilongjiang Province, North-East China. It is mixed up with *Dioryctria rubella,* but can be separated easily by structural differences of the genitalia.

Dioryctria magnifica Munroe

Dioryctria magnifica Munroe 1958. Far-eastern Pyralidae (Lepidoptera). Can. Ent. XC. p. 253—254. figs. 3 and 9.

Munroe discovered an erroneous determined species *Phycita splendidella* Caradja (1938) from Tapaishan of Tsinling, China and described as new species which we determined from its genitalia that it should be included in the *sylvestrella* group.



1. 昆明松梢斑螟 *Dioryctria kunmingnella* sp. nov. ♂, ♀
2. 云南松梢斑螟 *Dioyctria yuennanella* Caradja ♂, ♀
3. 微红梢斑螟 *Dioryctria rubella* Hampson ♂, ♀
4. 赤松梢斑螟 *Dioryctria sylyestrella* (Ratzeburg) ♂, ♀
5. 微红梢斑螟为害球果 Cone demaged by *Dioryctria rubella*.
6. 云南松梢斑螟为害华山松顶梢后 Top of Armand pine tree after demaged by *Dioryctria yuennanella*.